

### Remarks

Claims 1-7, 9-11, 13, 14, 16, 17, and 19-22 are in the application, of which claims 1 and 9 are in independent form. Applicants canceled claims 15 and 18 and their substance has been added to independent claims 1 and 9.

Claims 1, 9, and 10 have been amended in response to the Examiner's Office action. Claims 1 and 9 have been amended to include the following signature parameters: (i) a parameter based on a pen position expressed in x and y coordinates, (ii) a parameter based on a pressure applied to the pen tip, (iii) a pen tilt parameter measuring a pen angle with the digitizer surface, and (iv) a change of relative angle parameter measuring an orientation of the pen on the digitizer surface. Support for these amendments can be found in the specification at the following locations: page 4, lines 9-10, page 6, lines 17-23, page 8, lines 21-24, and reference numerals 62 and 63 of Fig 5.

Claims 1-6, 9-11, 17, and 20-22 stand rejected under 35 U.S.C. §102(e) for anticipation by U.S. Patent No. 5,892,824 to Beatson et al. The Examiner states that Beatson et al. discloses "a digitizer and an associated pen, a dynamic identification unit for receiving data from the digitizer produced during signing a signature with the pen on the digitizer, calculating signature parameters and permitted variations from the data, and generating a reference signature record therefrom. Beatson [et al.] discloses the reference signature record as a dynamic personal signature profile that is updated in accordance with received parameters produced during each accepted signature" (Office action, page 3)(citations omitted)(reference numerals omitted). Applicants respond as follows to this rejection.

Regarding the Examiner's rejection of independent claim 1, applicants agree with the Examiner that the general concept of signature authentication is known and that there are several signature authentication systems described in the prior art. However, none of the cited prior art references describe a system for authenticating a signature including all four of the following claimed signature parameters: "(i) a parameter based on a pen position expressed in x and y coordinates, (ii) a parameter based on a pressure applied to the pen tip, (iii) a pen tilt parameter measuring a pen angle with the digitizer surface, and (iv) a change of relative angle parameter measuring an orientation of the pen on the digitizer surface.," as provided in currently amended claim 1.

The first claimed signature parameter, pen position expressed in x and y coordinates, is a measure of the absolute position of the pen tip in the plane of the writing surface, as expressed in x and y coordinates. The position of the pen tip at any given time is a point rather than a line, and can thus be expressed in x and y coordinates. The second claimed

signature parameter, the pressure applied to the pen tip, is described at page 4, lines 9-10 of the specification.

Fig. 5 of the above-identified patent application shows the third and fourth signature parameters as follows: (1) reference numeral 62 relates to the pen tilt angle parameter, which is described at page 4, line 9, page 6, line 22, and page 8, line 21 of the above-identified application, and (2) reference numeral 63 relates to the change of relative angle parameter (also called the relative direction of signature), which is described on page 8, lines 22-23 of the above-identified application.

The pen tilt angle parameter relates to the enclosed acute angle between the pen and the plane of the digitizer (the angle of elevation, or internal angle between the pen and the plane of the writing surface). As the Examiner's comments concerning original claim 15 state, Beatson et al. does not describe a pen tilt angle parameter, *i.e.* the angle of elevation of the pen, that can be used for signature authentication. However, the Examiner asserts that Lee describes a signature authentication system including a pen tilt angle (Office action, page 8).

The change of relative angle parameter relates to the angle of rotation of the pen with respect to the plane of the digitizer surface, *i.e.*, the angle that the pen (resolved into x and y coordinates) makes with the positive x-axis or the rotational angle (between 0 degrees and 360 degrees) from the mean direction of the signature. Monitoring the change of relative angle parameter provides information regarding whether the signer is left- or right-handed, whether he or she "hooks," and other information that can be used for signature authentication. Further, the use of this parameter provides security against forgery, and it will readily be appreciated that the change of relative angle parameter is a unique characteristic of the signer. As such, this parameter can, together with the pen tilt angle parameter, be used to identify a forged signature.

It will also be appreciated that monitoring of the change of relative angle parameter can be used, together with the appearance of the signature and the subject's handwriting in general, to provide a basis for graphology analysis of the subject, the conclusions of which are affected by the dexterity (handedness) of the subject and whether the subject "hooks" his or her letters. Furthermore, none of the prior art known to the applicants discloses monitoring the change of relative angle parameter.

Because none of the cited prior art describes a signature authentication system including all four of the claimed signature parameters, applicants assert that currently amended independent claim 1 is patentable over the cited prior art because the prior art fails

to describe a system for authenticating a signature including “(i) a parameter based on a pen position expressed in x and y coordinates, (ii) a parameter based on a pressure applied to the pen tip, (iii) a pen tilt parameter measuring a pen angle with the digitizer surface, and (iv) a change of relative angle parameter measuring an orientation of the pen on the digitizer surface.”

Additionally, applicants assert that the more signature parameters that are monitored, the more variation can be tolerated between signatures while maintaining a high degree of certainty as to the identity of the signer. This provides greater robustness to the signature authentication system and minimizes the incidence of false rejections without compromising the reliability of accepted signatures. Applicants choose to rely on the arguments presented above with respect to independent claim 1 to support the patentability of their respective dependent claims 2-7 and 13, 14, 16, and 17.

Regarding the Examiner’s rejection of independent claim 9, currently amended claim 9 describes “a method of authenticating a signature including . . . dimensionally independent parameters including (i) a parameter based on a pen position expressed in x and y coordinates, (ii) a parameter based on a pressure applied to the pen tip, (iii) a pen tilt parameter measuring a pen angle with the digitizer surface, and (iv) a change of relative angle parameter measuring an orientation of the pen on the digitizer surface.” As discussed above with respect to claim 1, none of the cited prior art describes a method of authenticating a signature including all four of these signature parameters, and indeed the fourth parameter seems to be, in itself, novel and inventive. In view of the amendment to claim 9, applicants respectfully request that the rejection of claim 9 be withdrawn.

The Examiner makes three additional rejections under 35 U.S.C. § 103(a) for obviousness based on Beatson et al. alone and in view of two different references. Specifically, claim 16 stands rejected under 35 U.S.C. §103(a) for obviousness over Beatson et al., claims 7, 13, and 14 stand rejected under 35 U.S.C. §103(a) for obviousness over Beatson et al. in view of U.S. Patent No. 5,111,512 to Fan et al., and claims 15 and 18 stand rejected under 35 U.S.C. §103(a) for obviousness over Beatson et al. in view of U.S. Patent No. 5,422,959 to Lee. Claims 15 and 18 have been canceled. The remaining rejected claims all depend from one of independent claims 1 or 9. Applicants choose to rely on the arguments presented above with respect to independent claims 1 and 9 to support the patentability of their respective dependent claims. Consequently, applicants respectfully request that the rejections of these dependent claims be withdrawn.

In the specification, the paragraph beginning at page 7, line 24 was amended in accordance with the Examiner's suggestion.

Drawing Fig. 1 was amended to delete reference numeral 19 in accordance with the Examiner's suggestion.

Applicants believe that the application is in condition for allowance and respectfully request the same.

Respectfully submitted,

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Attorney Docket No. 35265/1:1